

Exhibit # ATTACH # 5

**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

**Before The Honorable Debra Morriss
Administrative Law Judge**

_____)	
In the Matter of:)	
)	Investigation No. 337-TA- 431
CERTAIN SYNCHRONOUS DYNAMIC)	
RANDOM ACCESS MEMORY DEVICES,)	
MICROPROCESSORS, AND PRODUCTS)	
CONTAINING SAME)	
_____)	

**RESPONSE OF HITACHI, LTD. TO THE COMPLAINT
AND NOTICE OF INVESTIGATION**

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RESPONSE TO THE COMPLAINT

Respondent Hitachi, Ltd. ("Hitachi") submits its Response to the Complaint, the letters amending the Complaint and the Notice of Investigation as follows.

Hitachi states that it has not yet had sufficient time and opportunity to collect and review all of the information that may be relevant to the matters raised herein and furthermore that discovery of Complainant and third parties has only just begun. Accordingly, Hitachi reserves the right to take further positions and raise additional defenses subsequent to the filing of this Response.

I. INTRODUCTION

1.1. Hitachi admits that Rambus Inc. ("Rambus") has requested the U.S. International Trade Commission to commence an investigation pursuant to section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337 (a)(1)(B)(i), and that Rambus has requested remedies under the statute. Hitachi denies any unlawful conduct, and denies that either the action or any remedy is warranted. Except as expressly admitted herein, the allegations contained in paragraph 1.1 are denied.

1.2. Hitachi denies the allegations contained in paragraph 1.2.

1.3. Paragraph 1.3 was amended by Rambus' letter of April 4, 2000 and Hitachi's answer is to the paragraph as amended. Hitachi admits the allegations contained in the first sentence of paragraph 1.3. Hitachi admits that the '918 and '195 patents identify Rambus as "assignee." Hitachi lacks sufficient information to form a belief as to the truth or falsity of paragraph 1.3's allegation that Rambus "owns by assignment the entire right, title and interest in and to these

patents,” and therefore denies those allegations. Hitachi admits that Exhibits 3 and 4 contain certified copies of recorded assignments of an application filed April 18, 1990 for “Integrated Circuit I/O Using a High Performance Bus Interface.” Hitachi states that the legal effect of such assignments on the ‘918 and ‘195 patents is a matter of law for the Commission. Except as expressly admitted herein, the allegations contained in paragraph 1.3 are denied.

1.4. Hitachi denies the allegations contained in paragraph 1.4.

1.5. Hitachi admits that Rambus seeks the relief described in paragraph 1.5, but denies that such relief is warranted. Hitachi denies the remaining allegations of paragraph 1.5.

II. COMPLAINANT

2.1. On information and belief, Hitachi admits the allegations contained in paragraph 2.1.

2.2. Hitachi admits the allegations contained in the first sentence of paragraph 2.2. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the second and third sentences of paragraph 2.2, and therefore denies those allegations. Hitachi denies the allegations contained in the fourth sentence of paragraph 2.2.

2.3. Hitachi admits that attached as Exhibit 5 is a document that purports to be Rambus’ annual report for 1999.

III. PROPOSED RESPONDENTS

3.1. Hitachi admits the allegations contained in the first sentence of paragraph 3.1. Hitachi admits that it is in the business of manufacturing and selling semiconductor devices, including SDRAMs and microprocessors, including products bearing the numbers identified in paragraphs 4.2 and 4.3 of the Complaint.^{1/} Hitachi further admits that it sells SDRAMs and microprocessors for importation into the United States. Hitachi admits that it sells certain SH-4 microprocessors to Sega Enterprises, Ltd. for incorporation into Sega's Dreamcast video game consoles. Except as expressly admitted herein, the allegations contained in paragraph 3.1 are denied.

3.2. Hitachi admits the allegations contained in the first sentence of paragraph 3.2; and admits that Hitachi Semiconductor (America) Inc. ("HSA") is a subsidiary of Hitachi America, Ltd. and is in the business of importing into and selling in the United States Hitachi SDRAM devices and microprocessors. Hitachi denies the allegations contained in the third sentence of paragraph 3.2. Except as expressly admitted herein, the allegations contained in paragraph 3.2 are denied.

3.3. Hitachi admits that Rambus and Hitachi, Ltd. entered into a semiconductor technology license agreement on October 30, 1992, and certain amendments and addenda thereto, including a royalty agreement, dated February 8, 1995, June 28, 1996, April 27, 1998, June 1, 1998 and November 12,

^{1/} Hitachi denies the allegations contained in the first and second sentences of footnote 1. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the third sentence of footnote 1.

1998. Hitachi admits that copies of the license agreement, its amendments, and a royalty agreement are attached as Confidential Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Except as expressly admitted herein, the allegations contained in paragraph 3.3 are denied.

3.4. Hitachi admits that Sega Enterprises, Ltd. is a Japanese corporation; admits that Sega Enterprises, Ltd. manufactures and sells "Dreamcast" video game consoles; and admits that Dreamcast video game consoles contain Hitachi SH-4 microprocessors. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations contained in paragraph 3.4, and therefore denies those allegations.

3.5. On information and belief, Hitachi admits that Sega of America is a California corporation. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in paragraph 3.5, and therefore denies those allegations.

IV. THE PRODUCTS AT ISSUE

4.1. Hitachi admits that the Notice of Investigation specifies that the investigation concerns "certain synchronous dynamic random access memory devices, microprocessors, or products containing the same," without information sufficient to form a belief as to the identity of each specific product accused of infringing each specific asserted claim, as well as Complainant's asserted construction of each allegedly infringed claim element, and therefore Hitachi denies those allegations. Except as expressly admitted herein, the allegations contained in paragraph 4.1 are denied.

4.2. Hitachi admits that this paragraph purports to give a general description of an SDRAM but denies that it is a complete description or definition, and reserves the right to more fully describe and define an SDRAM. Hitachi admits that Rambus has asserted the listed products are accused but denies that any of the listed products infringe the asserted patents. Hitachi denies that it produces products with the numbers HB54A329 and HB54A649. Except as expressly admitted herein, the allegations contained in paragraph 4.2 are denied.

4.3. Hitachi admits that this paragraph purports to give a general description of a microprocessor but denies that it is a complete description or definition, and reserves the right to more fully describe and define a microprocessor. Hitachi denies the allegations contained in the third and fourth sentences of paragraph 4.3. Except as expressly admitted herein, the allegations contained in paragraph 4.3 are denied.

4.4. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the first sentence of paragraph 4.4, and therefore denies those allegations. Hitachi admits the allegations contained in the second sentence of paragraph 4.4, and further admits that the HSA website mentions the Sega Dreamcast console. Except as expressly admitted herein, the allegations contained in paragraph 4.4 are denied.

V. THE PATENTS-IN-SUIT

A. The '918 Patent

1. Identification of the Patent and Ownership by Rambus

5.1. Hitachi admits that U.S. Patent No. 6,034,918 identifies Rambus as assignee, was issued on March 7, 2000, identifies Michael Farmwald and Mark Horowitz as inventors, and is entitled "Method of Operating a Memory Having a Variable Data Output Length and a Programmable Register." Except as expressly admitted herein, the allegations contained in paragraph 5.1 are denied.

5.2. On information and belief, Hitachi admits the allegations contained in paragraph 5.2.

2. Non-Technical Description of the Patented Invention

5.3. Hitachi denies that paragraph 5.3 provides an accurate description of the contents of the '918 patent and Hitachi refers to that patent for its complete and accurate contents. Hitachi admits that this paragraph purports to give general descriptions regarding the relationship between DRAM devices and microprocessors but denies that they are complete descriptions, and reserves the right to more fully describe the relationship between DRAM devices and microprocessors. Except as expressly admitted herein, the allegations contained in paragraph 5.3 are denied.

5.4. Hitachi denies that paragraph 5.4 provides an accurate description of the purported invention of the '918 patent or that the purported invention of the '918 patent achieves the advantages described. Hitachi lacks

sufficient information to form a belief as to the truth or falsity of the remaining allegations contained in paragraph 5.4, and therefore denies those allegations.

5.5. Hitachi denies that paragraph 5.5 provides an accurate description of the contents of the '918 patent and refers to that patent for its complete and accurate contents. Hitachi denies that any Hitachi SDRAMs or microprocessors infringe claims of the '918 patent, and denies the remaining allegations contained in paragraph 5.5.

3. Foreign Counterparts to the '918 Patent

5.6. Paragraph 5.6 was amended by Rambus' letter of April 12, 2000 and Hitachi's answer is to the paragraph as amended. Hitachi admits that Exhibits 10 and 11 are charts that purport to list each foreign patent issued that corresponds to the '918 patent and other information, but Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in Exhibits 10 and 11, or the letter of April 12, 2000 as it amends this paragraph, and therefore denies those allegations. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the third sentence of paragraph 5.6, and therefore denies those allegations; and further lacks sufficient information to form a belief as to the truth or falsity of Rambus' statement in its April 12, 2000 letter about the purported grant of a European patent, and therefore denies those allegations. Except as expressly admitted herein, the allegations contained in paragraph 5.6 are denied.

B. The '195 Patent

1. Identification of the Patent and Ownership by Rambus

5.7. Hitachi admits that U.S. Patent No. 6,038,195 identifies Rambus as assignee, was issued on March 14, 2000, identifies Michael Farmwald and Mark Horowitz as inventors, and is entitled "Synchronous Memory Device Having a Delay Time Register and Method of Operating Same." Except as expressly admitted herein, the allegations contained in paragraph 5.7 are denied.

5.8. On information and belief, Hitachi admits the allegations contained in paragraph 5.8.

2. Non-Technical Description of the Patented Invention

5.9. Hitachi denies that paragraph 5.9 provides an accurate description of the '195 patent or that the purported invention of the '195 patent achieves the advantages described.

5.10. Hitachi denies that paragraph 5.10 provides an accurate description of the contents of the '195 patent and refers to that patent for its complete and accurate contents. Hitachi denies that any Hitachi SDRAMs or microprocessors infringe claims of the '195 patent. Hitachi admits that this paragraph purports to give general descriptions regarding memory devices, but denies that they are complete descriptions, and reserves the right to more fully describe memory devices. Except as expressly admitted herein, the allegations contained in paragraph 5.10 are denied.

5.11. Hitachi denies that paragraph 5.11 accurately describes the contents of the '195 patent and refers to that patent for its complete and accurate

contents. Hitachi denies that any Hitachi SDRAMs or microprocessors infringe claims of the '195 patent.

5.12. Hitachi denies that paragraph 5.12 accurately describes the contents of the '195 patent and refers to that patent for its complete and accurate contents. Hitachi denies that any Hitachi SDRAMs or microprocessors infringe claims of the '195 patent.

5.13. Paragraph 5.13 was amended by Rambus' letter of April 12, 2000 and Hitachi's answer is to the paragraph as amended. Hitachi admits that Exhibits 12 and 13 are charts that purport to list each foreign patent issued that corresponds to the '195 patent and other information, but lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in Exhibits 12 and 13 and Rambus' letter of April 12, 2000 as it amends this paragraph, and therefore denies those allegations. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the third sentence of paragraph 5.13; and further lacks sufficient information to form a belief as to the truth or falsity of Rambus' statement in its April 12, 2000 letter about the purported grant of a European patent, and therefore denies those allegations. Except as expressly admitted herein, the allegations contained in paragraph 5.13 are denied.

VI. UNFAIR ACTS OF THE RESPONDENTS - PATENT INFRINGEMENT

6.1. Hitachi denies the allegations contained in paragraph 6.1.

Hitachi further denies the allegations contained in the subject heading preceding that paragraph.

6.2. Hitachi admits that Exhibit 14 contains a Hitachi data sheet for SDRAMs HM5264165-B60, HM5264805-B60, and HM5264405-B60.

Hitachi admits that Exhibit 15 purports to be a claim chart demonstrating how Rambus believes claim 1 of the '195 patent applies to the HM5264165-B60, HM5264805-B60 and HM5264405-B60 SDRAMs. Hitachi denies that the claim chart shows infringement and denies Complainant's alleged claim construction, including but not limited to all factual and legal conclusions as to validity, scope, meaning, or enforceability of the alleged '195 patent claims, as alleged in Exhibit 15. Hitachi further states that the meaning and effect of the claims and any limitations of the '195 patent is a matter of law for the Commission. Except as expressly admitted herein, the allegations contained in paragraph 6.2 are denied.

6.3. Hitachi admits that Exhibit 16 purports to be a claim chart demonstrating how Rambus believes claim 18 of the '918 patent applies to the HM5264165-B60, HM5264805-B60 and HM5264405-B60 SDRAMs. Hitachi denies that the claim chart shows infringement and denies Complainant's alleged claim construction, including but not limited to all factual and legal conclusions as to validity, scope, meaning, or enforceability of the alleged '918 patent claims,

as alleged in Exhibit 16. Hitachi further states that the meaning and effect of the claims and any limitations of the '918 patent is a matter of law for the Commission. Except as expressly admitted herein, the allegations contained in paragraph 6.3 are denied.

6.4. Hitachi admits that Exhibit 17 and 18 contain a product brief and portions of a Hitachi hardware manual for the SH7750 microprocessor, which is part of the SH-4 series. Hitachi admits that Exhibit 19 purports to be a claim chart demonstrating how Rambus believes claim 23 of the '195 patent applies to the SH7750 microprocessor. Hitachi denies that the claim chart shows infringement and denies Complainant's alleged claim construction, including but not limited to all factual and legal conclusions as to validity, scope, meaning, or enforceability of the alleged '195 patent claims, as alleged in Exhibit 19. Hitachi further states that the meaning and effect of the claims and any limitations of the '195 patent is a matter of law for the Commission. Except as expressly admitted herein, the allegations contained in paragraph 6.4 are denied.

6.5. Hitachi admits that Exhibit 20 purports to be a claim chart demonstrating how claim 1 of the '918 patent applies to the SH7750 microprocessor. Hitachi denies that the claim chart shows infringement and denies Complainant's alleged claim construction, including but not limited to all factual and legal conclusions as to validity, scope, meaning, or enforceability of the alleged '918 patent claims, as alleged in Exhibit 20. Hitachi further states that the meaning and effect of the claims and any limitations of the '918 patent is a

matter of law for the Commission. Except as expressly admitted herein, the allegations contained in paragraph 6.5 are denied.

6.6. Hitachi denies the allegations contained in paragraph 6.6.

6.7. Hitachi admits that it received a copy of the Complaint in this matter and thereby obtained knowledge of the claims asserted therein.

Hitachi denies the remaining allegations contained in paragraph 6.7.

VII. SPECIFIC INSTANCES OF UNFAIR IMPORTATION AND SALE

7.1. Hitachi admits the allegations contained in the first sentence of paragraph 7.1. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the second sentence of paragraph 7.1, and therefore denies those allegations. Hitachi further denies that it has engaged in any acts of unfair importation and sale.

7.2. Hitachi admits the allegations contained in the first and second sentences of paragraph 7.2. Hitachi admits that Exhibit 26 purports to be a copy of a receipt for the purchase of a Hitachi SDRAM in the United States. Hitachi admits that Exhibit 27 is a copy of HSA's web page, and refers to that exhibit for its complete and accurate contents. Except as expressly admitted herein, the allegations contained in paragraph 7.2 are denied.

7.3. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the first sentence of paragraph 7.3, and therefore denies those allegations. Hitachi admits the microprocessor in the photograph appears to bear a country of origin marking of Japan. Hitachi lacks sufficient information to form a belief as to the truth or

falsity of the remaining allegations contained in paragraph 7.3, and therefore denies those allegations.

7.4. Hitachi admits that Exhibit 29 purports to be a copy of a receipt for the purchase of a Dreamcast video game console in the United States. Hitachi admits that Exhibit 30 is a copy of HSA's web page and refers to that exhibit for its complete and accurate contents.

7.5. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the first sentence of paragraph 7.5, and therefore denies those allegations. Hitachi admits that Exhibit 31 purports to be a copy of a receipt for the purchase of a Dreamcast video game console in the United States, and that it is dated March 19, 2000.

7.6. Hitachi admits that certain of the products that Rambus has accused enter the United States under Harmonized Tariff Schedule number 8542.13.80. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations contained in paragraph 7.6, and therefore denies those allegations.

VIII. LICENSES

8.1. Hitachi admits that Rambus licenses Rambus patents. Hitachi denies Rambus' characterization of its license restrictions as "field of use" restrictions and further states that the legal effect of the license restrictions under the patent or antitrust laws is a matter of law for the Commission. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the first, second, third and fourth sentences of paragraph 8.1; and in

particular lacks sufficient information to form a belief as to the truth or falsity of Rambus' allegations so far as they relate to the licensing of the '918 and '195 patents, and therefore denies those allegations. Hitachi admits that copies of the license agreements between Hitachi and Rambus accompany the Complaint as Confidential Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Except as expressly admitted herein, the allegations contained in paragraph 8.1 are denied.

IX. THE DOMESTIC INDUSTRY

9.1. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in paragraph 9.1, and therefore denies those allegations.

9.2. Hitachi admits that Rambus licenses Rambus patents to companies that agree to manufacture RDRAM-compatible products. To the extent that the allegations contained in the second, third and fourth sentences of paragraph 9.2 refer to the license agreements between Hitachi and Rambus, Hitachi states that copies of the license agreements between Hitachi and Rambus accompany the Complaint as Confidential Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations contained in paragraph 9.2, and therefore denies those allegations.

9.3. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in paragraph 9.3, and therefore

denies those allegations. Hitachi denies that Rambus' alleged investments constitute a domestic industry.

9.4. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations in paragraph 9.4, and therefore denies those allegations.

9.5. Hitachi admits that Confidential Exhibit 32 purports to describe Rambus' investments in promoting its technology to potential licensees and other information, but Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in Exhibit 32, and therefore denies those allegations. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations in paragraph 9.5, and therefore denies those allegations.

9.6. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations in the first sentence of paragraph 9.6, and therefore denies those allegations. Hitachi further states that copies of the license agreements between Hitachi and Rambus accompany the complaint as Confidential Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Hitachi admits the allegations contained in the second sentence of paragraph 9.6.

9.7. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations in paragraph 9.7, and therefore denies those allegations.

9.8. Hitachi states that the Rambus-Hitachi license agreement accompanies the Complaint as Confidential Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations in paragraph 9.8, and therefore denies those allegations.

9.9. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in paragraph 9.9, and therefore denies those allegations. Hitachi denies that Rambus' alleged investments constitute a domestic industry.

9.10. Hitachi admits that Confidential Exhibit 32 purports to describe the number of Rambus employees specifically devoted to licensing the class of accused products under these patents, and Rambus' personnel and overhead expenses devoted to licensing the accused class of products. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in Confidential Exhibit 32, and in Paragraph 9.10, and therefore denies those allegations.

9.11. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations in paragraph 9.11, and therefore denies those allegations. Hitachi admits that Confidential Exhibit 32 purports to describe the number of Rambus employees that Rambus expects to devote to the licensing of the accused product throughout FY 2000 and 2001 and other information, but Hitachi lacks sufficient information to form a belief as to the truth or falsity of the

information contained in Confidential Exhibit 32, and therefore denies those allegations.

X. RELATED LITIGATION

10.1. Paragraph 10.1 was amended by Rambus' letter of April 12, 2000 and Hitachi's answer is to the paragraph as amended. Hitachi admits that Rambus has sued Hitachi Europe GmbH in Germany for infringement of a European Patent and a German utility model. Hitachi further admits that Rambus filed Complaints against Hitachi, Ltd. and HSA in the United States District Court for the District of Delaware, asserting infringement of patents that are part of the same related family of patents as the '195 and '918 patents. Hitachi states that these actions have been transferred to the Northern District of California. Hitachi further states that Rambus' claims against Hitachi in the foregoing actions are wholly without merit. Except as expressly admitted herein, the allegations contained in paragraph 10.1 are denied.

XI. RELIEF REQUESTED

11.1 Hitachi admits that Rambus is seeking the relief requested in paragraph 11.1, but denies that any such relief is warranted.

RESPONSE TO ALLEGATIONS CONTAINED IN RAMBUS' LETTER OF APRIL 4, 2000

The complaint has been amended by Rambus' letter of April 4, 2000, in which Rambus responded to certain inquiries by OUII concerning the complaint. Hitachi answers these allegations of the April 4, 2000 letter as follows:

1. Hitachi denies that Hitachi microprocessors practice any claimed methods in the '918 and '195 patents. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations of point 1 on page 2 of the April 4, 2000 letter, and therefore denies those allegations.

2. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in the first sentence of point 2 on page 2 of the April 4, 2000 letter, and therefore denies those allegations. Hitachi admits that the HSA website mentions the Sega Dreamcast video game console, admits that it markets its microprocessors for data processing, communications, industrial, transportation and consumer applications, and further admits that it markets its SDRAM devices for computer, workstation, and server applications. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the remaining allegations contained in point 2, and therefore denies those allegations.

3. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations concerning Rambus' licensing activities contained in point 3 on pages 2 and 3 of the April 4, 2000 letter, and therefore denies those allegations. To the extent that such allegations refer specifically to the License Agreement between Hitachi and Rambus, Hitachi admits that copies of the license agreements between Hitachi and Rambus accompany the Complaint as Exhibit 7, and Hitachi refers to those agreements for their complete and accurate contents. Hitachi denies that Rambus' alleged licensing activities constitute a domestic industry. Hitachi admits that Confidential Exhibit 32

purports to set forth Rambus' alleged investments in licensing technology other than RDRAM technology under the '918 and '195 patents. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the information set forth in Confidential Exhibit 32, and therefore denies those allegations. Except as expressly admitted herein, Hitachi denies each of the allegations of point 3 on pages 2 and 3 of the April 4, 2000 letter.

4. Hitachi lacks sufficient information to form a belief as to the truth or falsity of the allegations contained in point 4 on page 3 of the April 4, 2000 letter, and therefore denies those allegations.

Rambus' letter of April 12, 2000 amends paragraphs of the Complaint and Hitachi has answered the allegations contained in those paragraphs as amended by the April 12, 2000 letter. Except as expressly admitted herein, Hitachi denies the allegations contained in Rambus' letters of April 4, 2000 and April 12, 2000.

RESPONSE TO NOTICE OF INVESTIGATION

Hitachi admits that the notice of investigation names Hitachi, Ltd. and Hitachi Semiconductor (America) Inc., as respondents but denies that either has violated 19 U.S.C. § 1337 by importing into the United States, selling for importation into the United States, or selling within the United States after importation certain synchronous dynamic random access memory devices, microprocessors, or products containing same by reason of infringement of claims 1-24, 27, 32, and 33-39 of U.S. Letters Patent 6,038,195 or claims 1-3, 6-10, 13-16, 18-21, 24-26, 29-31, 33-34 and 37-38 of U.S. Letters Patent 6,034,918.

Hitachi denies that the Commission should issue a permanent exclusion order, a permanent cease and desist order, or any other relief. Except as expressly admitted herein, Hitachi denies the allegations contained in the Notice of Investigation.

INFORMATION UNDER COMMISSION RULE 210.13

1. Hitachi states that it is still attempting to determine the quantity and value of imports of the several accused articles.

2. Hitachi states that the United States is significant to its operations. Hitachi further states that its worldwide production capacity and sales for SDRAMs and SH microprocessors is as set forth in Confidential Exhibit

B.

AFFIRMATIVE DEFENSES

Hitachi asserts the following affirmative and other defenses and reserves the right to modify and expand the defenses as discovery proceeds in this investigation.

Facts Giving Rise To The Affirmative Defenses

1. The '195 patent issued from an application filed November 20, 1998. Rambus filed a continuation application of the '195 patent on November 19, 1999 which issued as the '918 patent. Each of these applications asserts that it is a continuation and/or division of earlier-filed applications in a chain of related applications leading back to an original parent application filed April 18, 1990. Rambus abandoned the original parent application in favor of at least 11 applications filed in 1992 each of which was asserted to be a continuation or division of the parent application. Thereafter, Rambus filed additional continuations and divisions also claiming the benefit of the April 18, 1990 parent application. A total of at least 41 applications were filed in the United States as continuation or divisional applications which assert the benefit of the common April 18, 1990 filing date (collectively, the "Related Family"). These related applications resulted in at least 25 issued patents, including the '195 and '918 patents.

2. The parent application filed April 18, 1990 contained claims 1-150. In filing the continuation and division applications in the Related Family, Rambus adopted a practice of filing a Preliminary Amendment which cancelled the original claims and added various new claims. Beginning about

1994, the Preliminary Amendment would be accompanied by a Request To Approve Drawing Changes, which would amend various figures of the original disclosure and/or add new figures. In these amendments to the claims and the drawings, Rambus would assert that the changes were supported by the original specification filed April 18, 1990. Some of these same amendments to the drawings and specification, as well as other amendments to the drawings and specification, were made to other applications in the Related Family.

3. The '195 patent as issued contains 40 claims, and the '918 patent as issued includes 38 claims. These claims contain numerous elements which have the same or closely related language to issued claims in numerous patents in the Related Family. By way of example, claim 1 of the '918 patent is substantially similar to claim 1 of Patent 6,032,214, which is part of the Related Family. Statements in the file history of prosecution of applications in the Related Family which claim similar or the same subject matter, or which refer to similar or the same terms or phrases, and assertions to the Examiner and Patent Office concerning the meaning and scope of such subject matter or terms or phrases, are applicable to and/or constitute admissions concerning the scope and support of corresponding claim language in the '918 and '195 patents.

4. After filing the parent application on April 18, 1990, Rambus licensed the technology to various third parties who were to manufacture Rambus-compatible memory devices under the trademark "RDRAM." Rambus licensed a variation of the original disclosure which was called the "Base" technology. This was later revised to create a "Concurrent" technology, which in

turn was further revised to create a "Direct" technology. With each revision of the RDRAM technology, from "Base" to "Concurrent" to "Direct", the technology was changed in significant aspects from the disclosure of the April 18, 1990 parent application. Numerous aspects of the original disclosure were abandoned, and certain other aspects and circuitry were substantially changed. On information and belief, various changes to the Base, Concurrent, and Direct versions of the RDRAM technology were the development of third parties and/or persons different than the named inventors of the '195 and '918 patents.

5. Prior to April 18, 1990, the named inventors attended meetings and/or received mailings of an IEEE subgroup working on various standards for semiconductor memories, and in particular attended a subgroup known as the Scalable Coherent Interface or SCI. The SCI group considered various memory issues, such as inefficiency caused by latency, and studied various solutions. The group later evolved into a related group called RamLink. The SCI and RamLink groups were part of various standard-setting activities from the late 1980s and into the mid-1990s, which included standard development efforts such as SyncLink. The named inventors of the '195 and '918 patents, and various employees of Rambus, attended numerous of these standard-setting meetings, and/or received minutes and reports from these meetings, from the late 1980s the mid-1990s.

6. Another standard-setting activity involving synchronous DRAMs involved certain committees of the Joint Electronic Devices Engineering Council ("JEDEC"), including but not limited to the JC-42.3 committee on RAM

memories. In 1991, JEDEC members began considering the development of standards for synchronous DRAM (SDRAM) technology. Rambus began attending JEDEC committee meetings no later than December 1991 and formally joined as a committee member at least as early as 1992. Rambus continued as a committee member until it announced it was leaving JEDEC by a June 17, 1996 letter.

7. During prosecution of the Related Family, including but not limited to the '195 and '918 patents, the claims of the applications were amended to cover the evolving Base/Concurrent/Direct Rambus technology and/or the synchronous DRAM standards developed in SCI, RamLink, and JEDEC, even though the parent application lacked support for the belatedly-claimed features and the later technology was not the invention of the named inventors. Also, Rambus through its attorneys made contradictory assertions in different applications of the Related Family, in order to obtain allowance of the claims in those applications and without calling attention that its statements were contrary to statements in other applications containing the same claim language. The purpose of this pattern of conduct was to obtain claim coverage on technology which was altered from and not the invention of the named inventors in the parent application, in order to improperly encompass these later developments.

First Defense
(Invalidity)

8. The allegations of paragraphs 1-7 are incorporated by reference in this First Defense.

9. The '195 and '918 patents are invalid for failing to comply with the conditions and requirements for patentability set forth in the United States Patent Statute, including, but not limited to 35 U.S.C. §§ 101, 102, 103, 112, 113, 115, 120, 121 and 132.

10. The issued claims of the '195 and '918 patents are not entitled to the benefit of the April 18, 1990 filing date of the parent application nor to the filing dates of certain other applications in the Related Family leading to the '195 and '918 patents.

11. The '195 and '918 patents are invalid for failure to satisfy the requirements of 35 U.S.C. § 112. In view of the various amendments that occurred during the long prosecution history of the patents and earlier applications in the Related Family, the claims of the '195 and '918 patents as issued now bear little resemblance to the purported invention that was described in the original application. Numerous claim limitations do not have any support in the original specification. The asserted claims are invalid as inoperable. The asserted claims are invalid as not enabled. The asserted claims are invalid for failure to distinctly claim what the named inventors viewed as their invention. The asserted claims are invalid for omitting essential elements.

12. During the prosecution of the applications in the Related Family, Rambus filed Requests to Approve Drawing Changes, which amended the figures in a manner unsupported by the original specification and was misleading as to the amended claims, in violation of 35 U.S.C. § 113.

13. The asserted claims of the '195 and '918 patents are invalid for presenting new matter and new claims which are unsupported by the oaths of the named inventors, in violation of 35 U.S.C. §§ 115 and 132.

14. On information and belief, the written description and the drawings are not in such full, clear, concise and exact terms as to enable any person skilled in the art to make and use the same without undue experimentation. On information and belief, the circuitry of various figures is inoperative, and/or cannot be used without undue experimentation. Such inoperativeness is evidenced by the abandonment of such structure in the Rambus Base/Concurrent/Direct RDRAM products.

15. The Patent Examiner who examined the original parent application asserted that Rambus had claimed eleven different alleged inventions in the 150 claims that were originally filed. The Examiner required Rambus to elect which group or groups of claims it wished to prosecute. Over the next decade and to the present day, Rambus has filed divisional and continuation applications in the Related Family, with similar and/or overlapping claims in the various related applications. Rambus has not maintained the line of demarcation that is required between the independent and distinct inventions that prompted the restriction requirement in the original application and that led to the multiple

divisional applications, in violation of the principle of "consonance."

Accordingly, the '195 and '918 patents are invalid.

16. Moreover, due to the lack of consonance, the protections of 35 U.S.C. § 121 do not apply to the patents resulting from such divisional applications. Various of the Rambus Related Family, including the '195 and '918 patents, are therefore invalid for double patenting.

17. The asserted claims of the '195 and '918 patents are invalid under 35 U.S.C. §§ 102 and/or 103. A listing of the printed prior art references which, either alone or in combination, render the '195 and/or '918 patents invalid is attached to this response as Exhibit A. In addition, the asserted claims are invalid for prior use and/or sale before the filing date of the '195 and '918 patents in the United States, its territories or possessions. Further, the printed prior art publications refer in part to certain standard-setting activities which constitute prior art, and/or concern certain products which were made, used or sold in the United States and which separately constitute prior art.

18. Hitachi also believes that the asserted claims of the '195 and '918 patents are invalid due to their failure to satisfy other requirements of the patent statutes, and Hitachi reserves the right to alter or supplement its defense as the investigation proceeds.

Second Defense
(Noninfringement)

19. The allegations of paragraphs 1-18 are incorporated by reference in this Second Defense.

20. Hitachi denies that the accused products, either literally or under the doctrine of equivalents, infringe the asserted claims of either the '195 or '918 patent. This affirmative defense is based upon Hitachi's current knowledge and understanding, and Hitachi reserves the right to present and rely on any and all support for this defense discovered in the course of this investigation. Hitachi will in the course of this investigation, *inter alia*, take discovery concerning Complainant's infringement contentions, including Complainant's contentions as to construction of the asserted claim elements, and will present Hitachi's contentions as to proper claim construction and non-infringement.

21. The asserted claim language was added long after the original filing date in an attempt to improperly cover the Base/Concurrent/Direct Rambus technology and/or synchronous DRAM technology pursuant to the JEDEC standards. The claim language is instead restricted in scope to the meanings in the original application as filed on April 18, 1990, when supported at all, and as properly construed does not cover the accused products. In addition, the accused products are so different in function and operation from that originally disclosed or properly claimed in the '195 and '918 patents that the accused products could not be found to infringe under a doctrine of equivalents analysis.

22. The drawing amendments submitted after the filing date of the original application dated April 18, 1990 may not be used under 35 U.S.C. § 113 to supplement the original disclosure for the purpose of interpretation of the

scope of any claim, and Rambus is improperly attempting to supplement the original disclosure so as to encompass the accused devices.

23. Hitachi reserves the right to alter or supplement its non-infringement defense as the investigation proceeds.

Third Defense

(Inequitable Conduct and Patent Misuse)

24. The allegations of paragraphs 1-23 are incorporated by reference in this Third Defense.

25. Upon information and belief, the '195 and '918 patents are unenforceable and have been misused for reasons that include but are not limited to the facts set forth above. Rambus' conduct includes improper and knowing filing of amendments which added claims and drawings not supported in the original application, failure to disclose the derivation of the subject matter of the added claims, improper inventorship, misleading and inconsistent statements made in applications of the Related Family, and failure to maintain the proper line of demarcation between the divisional and continuation applications. Furthermore, the unenforceability of certain other patents in the Related Family taint the '195 and '918 patents and also render unenforceable the '195 and '918 patents.

26. On information and belief, Rambus engaged in a pattern of conduct to file and amend the applications in the Related Family, add new claims and new drawings, and make assertions to the Patent Office to attempt to encompass the features of the altered Rambus Base/Concurrent/Direct technology

and/or the synchronous DRAM technology without regard to support or inventorship and by making misleading and false statements to the U.S. Patent Office. On information and belief, Rambus was aware that various language of the claims as amended was unsupported or contrary to the original specification, and such amendments were made with an intent to deceive and improperly encompass synchronous DRAM technology covered by the JEDEC standards and/or the Base/Concurrent/Direct Rambus technology which had changed from the original disclosure on April 18, 1990.

27. Rambus through its attorneys made contradictory assertions in different applications of the Related Family, in order to obtain allowance of the claims in those applications and without calling attention to the fact that its statements were contrary to statements in other applications concerning the same language. The purpose of this pattern of conduct was to obtain claim coverage on technology which was not the invention of the named inventors and not adequately disclosed in the April 18, 1990 parent application. Under the Doctrine of Infectious Unenforceability, the improper conduct concerning any of the patents and applications in the Related Family will taint and infect the enforceability of the '195 and '918 patents.

28. JEDEC Standards relating to SDRAMs have existed since 1992. Since 1992, several generations of JEDEC SDRAMs have been introduced. JEDEC-compliant SDRAMs perform various functions which Rambus has attempted to cover by claims filed belatedly and improperly in an attempt to cover

those functions despite lack of support in the original disclosure. Rambus' inventors and personnel connected with the prosecution of the '195 and '918 patents were during all relevant times aware of the 1992 and subsequent JEDEC SDRAM standards, having participated in the industry and the standard-setting process prior to all relevant times involving the pendency of the applications which issued as the '195 and '918 patents.

29. Rambus' inventors and personnel connected with the prosecution of the '195 and '918 patents were not in possession of the inventions ultimately claimed in the '195 and '918 patents prior to those patents' actual filing dates in 1998 and 1999. Instead, Rambus' inventors and personnel connected with the prosecution of the '195 and '918 patents added claims to those patents to read on JEDEC-compliant SDRAMs.

30. The Rambus named inventors and other Rambus personnel also participated in other industry standard-setting efforts in the late 1980s and early 1990s and improperly amended the applications in the Related Family to attempt to cover the technology developed through those efforts. On information and belief, the Rambus named inventors and/or their attorneys came into possession of the claims not through their own effort but by studying the standards developed by others and/or the changed Base/Concurrent/Direct technology as developed by others.

31. Rambus' filing of new claims to read on JEDEC-compliant SDRAMs and the changed Base/Concurrent/Direct technology constituted

material information which was false and misleading and constituted inequitable conduct. Moreover, such information is material to the patentability of the '195 and '918 patents under 37 CFR 1.56. On information and belief, Rambus knowingly failed to disclose this material information to the Patent Office during the prosecution of the '195 and '918 patents, and other applications in the Related Family, which constitutes inequitable conduct rendering all patents in the Related Family unenforceable.

32. Rambus' attempt to enforce patents acquired through misrepresentations and omissions also constitutes patent misuse and/or a violation of the antitrust laws. But for Rambus' knowing misrepresentations and omissions to the Patent Office, the '195 and '918 patents would not have issued. Rambus already controls the RDRAM technology which is the significant alternative architecture to the "open" JEDEC interface standard. If Rambus' patents are construed as covering the JEDEC standards governing SDRAMs, then Rambus has monopoly power or a dangerous probability of successfully monopolizing the relevant U.S. markets for the interface technology for high-speed synchronous DRAM memory, and for synchronous DRAM memory and logic chips which control such memory. On information and belief, Rambus made these misrepresentations and omissions with a specific intent to monopolize the relevant markets, and with the purpose and/or effect of restraining competition in the relevant markets.

Fourth Defense

(Unclean Hands, Equitable Estoppel, Implied License, and Patent Misuse in Connection with Misconduct in Standard-Setting Activities and Other Conduct)

33. The allegations of paragraphs 1-32 are incorporated by reference in this Fourth Defense.

34. Rambus is asserting patents that are unenforceable due to Rambus' misuse and/or violation of the antitrust laws, including but not limited to Rambus' actions and concealment in connection with standard-setting activities and participation in standards-setting organizations. Because of this same conduct, Rambus comes to this proceeding with unclean hands and should be equitably estopped from obtaining any relief.

35. JEDEC is the semiconductor engineering standardization body of the Electronic Industries Alliance ("EIA"), a non-profit standard-setting organization open to the industry and designed to foster competition in the several markets for computer chips. In the 1990s, JEDEC coordinated the development of technology standards for synchronous DRAM, including standards for the synchronous DRAM "interfaces" between memory chips and logic chips at issue in this action. Synchronous DRAM products and interfaces conforming to the JEDEC standards are commonly called SDRAM.

36. Rambus was a JEDEC member at that time and knew or should have known of JEDEC's disclosure rules, designed so that no firm could secretly capture the open standard under development. These rules required Rambus to disclose to JEDEC the existence and nature of its patent rights and

pending patent applications that could bear upon a standard that JEDEC members had under development. Upon disclosure, holders of patents or applications were to make their patents available without charge or under reasonable terms and conditions that were demonstrably free of any unfair discrimination. JEDEC members and participants had to rely on the good faith of their fellow JEDEC members and participants to comply with their duty to disclose if JEDEC members were to develop truly open standards, as was their charter.

37. Instead of fulfilling its duty to disclose, Rambus concealed its patent position, including its then-pending patent applications that through subsequent applications led to the '195 and '918 patents. During JEDEC committee meetings, while Rambus remained silent about its patent applications, and its plan to file additional applications to attempt to cover the proposed standards, other JEDEC members and participants participated in good faith, and shared their technical information so that open industry standards could be developed. Rambus then improperly revised its pending applications and subsequent applications based on then-pending applications to cover what it learned from its participation in JEDEC and the disclosures of other JEDEC members and participants. Thus Rambus intentionally misled JEDEC members into promulgating a standard which, according to Rambus' allegations against Hitachi, is not the open standard the JEDEC members intended and believed it to be.

38. Without knowledge of Rambus' pending applications, JEDEC determined an industry standard for SDRAM interface technology. JEDEC members and participants reasonably and substantially relied on Rambus' silence regarding its patent position and patent applications and, thus, continued to participate in developing the JEDEC open standard instead of exploring alternative standards. Hitachi and other firms in the industry spent millions of dollars in product development, testing, and marketing of SDRAM chips and other products compatible with what was thought to be an open technology. Rambus now asserts that certain of its patents cover the JEDEC SDRAM interface technology standards. Moreover, in suing Hitachi in successive lawsuits in federal court, in making public comments, and in pursuing this action, Rambus has sent a signal to Rambus' competitors and customers that if Rambus has its way, there will be no competition in the relevant markets.

39. Likewise, Rambus has engaged in anticompetitive licensing and tying practices that preclude it from obtaining relief in this proceeding. Rambus has licensed its technology both to DRAM manufacturers, including Hitachi, Ltd., Samsung, NEC, and others, and to manufacturers of Logic Chips, including Intel. Rambus' licenses and technical collaboration agreements impose substantial and unwanted obligations on licensees. For example, Rambus' licenses do not simply permit the use of Rambus patents. Rather, the license agreements require, as a condition of licensing one of Rambus' patents, that the licensees license numerous other Rambus patents. The license agreements also require the licensees to use the patents to manufacture synchronous memory only

to Rambus' requirements, including requiring the licensees to use Rambus-controlled tests and know-how to manufacture their products to Rambus' specifications.

40. Rambus already controls the RDRAM standard which is the significant alternative architecture to the "open" JEDEC standard. If Rambus' patents are construed as covering the JEDEC standards governing SDRAMs, then Rambus has monopoly power or a dangerous probability of successfully monopolizing the relevant U.S. markets for the interface technology for high-speed synchronous DRAM memory, and for synchronous DRAM memory and logic chips.

Fifth Defense

(Non-Infringement/Implied License/Patent Exhaustion as to Hitachi Microprocessors)

41. The allegations of paragraphs 1-40 are incorporated by reference in this Fifth Defense.

42. The asserted claims of the '195 and '918 patents are directed to synchronous DRAM apparatus, methods of operating synchronous DRAMs, and methods of controlling synchronous DRAMs during operation. A synchronous DRAM is a critical element of each asserted claim. The '195 and '918 patents do not claim any type of controller in a microprocessor. Hitachi's accused SH microprocessors cannot, by itself, infringe any asserted claim of the '195 or '918 patent.

43. Hitachi's accused SH microprocessors are designed for use not only with synchronous DRAM but also with a variety of other types of DRAM memories, and as such is a staple article of commerce whose importation and sale cannot constitute unfair competition. Thus, an exclusion order directed to the SH is not an appropriate remedy.

44. The SH as used in the Sega Dreamcast system together with synchronous DRAMs manufactured by third parties. To the extent such third-party synchronous DRAMs are or will be licensed by Rambus, Rambus has exhausted its patent rights and/or has granted an implied license to use the Hitachi SH microprocessors in combination with any licensed synchronous DRAM.

45. Moreover, Rambus has excluded any third-party (i.e., non-Hitachi) synchronous DRAMs from this investigation, and thus cannot assert that any non-Hitachi synchronous DRAMs are critical components to establish infringement of the '195 and '918 Patents. Since a synchronous DRAM is a critical element of each of the asserted claims, but only third-party synchronous DRAMs which have not been accused of infringement are used in the Sega Dreamcast, Rambus cannot establish infringement of the accused SH microprocessors. Thus, an exclusion order directed against the SH microprocessors by itself, or against the Sega Dreamcast system, is not an appropriate remedy.

Sixth Defense

(Lack of Domestic Industry)

46. Rambus has not adequately alleged and cannot prove the existence of a domestic industry or that a domestic industry is in the process of being established.

REQUEST FOR RELIEF

WHEREFORE, Hitachi, Ltd. respectfully requests that the Commission:

- i. Determine that Hitachi, Ltd. and HSA do not violate Section 337 of the Tariff Act of 1930 as amended (19 U.S.C. § 1337).
- ii. Deny all relief requested in the Complaint.
- iii. Determine that the '918 and '195 patents are unenforceable and misused
- iv. Determine that the '918 and '195 patents are invalid and not infringed.
- v. Award Hitachi its full costs of this action, including reasonable attorneys' fees.

vi. Order the investigation terminated.

Dated: May 19, 2000

Respectfully submitted,

By: 

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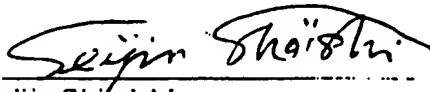
VERIFICATION OF RESPONSE

I, Seijin Shiraishi, being the Department Manager of the Strategic Business Planning Division, Semiconductor & Integrated Circuits, for Hitachi, Ltd., and as such I am authorized to make this verification on behalf of Hitachi, Ltd. I further declare that the foregoing Response was prepared with the advice and assistance of counsel, and the information therein was gathered from a number of persons, none of whom possesses all the information set forth in the Response. Based on the foregoing, and based on the information currently available to Hitachi, Ltd., I declare that to the best of my knowledge, information and belief that the foregoing responses are true and correct.

I declare under penalty of perjury of the laws of the United States of America that the foregoing is true and correct.

Executed on this 19 day of May, 2000.

HITACHI, LTD.


Seijin Shiraishi

CERTIFICATE OF SERVICE

The undersigned hereby certifies that copies of the foregoing

**RESPONSE OF HITACHI, LTD. TO THE COMPLAINT
AND NOTICE OF INVESTIGATION**

were caused to be served today, May 19, 2000, on the following counsel of record by the manner indicated:

Donna R. Koehnke, Secretary
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Invalidating Prior Art to the '195 and '918 Patents

This appendix is based upon Hitachi's current factual knowledge and understanding.

Hitachi reserves the right to rely on and present additional invalidating prior art as to the '195 and '918 patents discovered in the course of this investigation.

1. Kawamasa, K.; "Memory Control Method"; Japanese Patent Application Kokai Publication No. S56-82961 (July 7, 1981).*
2. Taguri, J.; "Memory Storage Device"; Japanese Patent Application Kokai Publication No. S57-14922 (January 26, 1982).*
3. Redwine et al.; "Semiconductor Read/Write Memory Array Having Serial Access"; United States Patent No. 4,330,852 (May 18, 1982).
4. Hasegawa, J.; "Memory System"; Japanese Laid Open Patent Application No. Sho 60-80193 (May 8, 1983).*
5. Miyazaki, Y.; "Block Transfer and Storage Control Method"; Japanese Laid-open Patent Application Sho 60-55459 (March 30, 1985).*
6. Hashimoto, S.; "Data Transfer Control System"; Japanese Patent Application Kokai Publication No. S61-72350 (April 14, 1986).*
7. Fischer, M.; "Fair Arbitration Technique for a Split Transaction Bus in a Multiprocessor Computer System"; United States Patent No. 4,785,394 (November 15, 1988).
8. Wantanabe, T.; "Session XIX: High Density SRAMs"; IEEE International Solid State Circuits Conference pp. 266-267 (1987).
9. James, D.; "Method and Apparatus for Performing Variable Length Data Read Transactions"; United States Patent No. 4,703,418 (October 27, 1987).
10. Taguchi, Y.; "Memory Device"; Japanese Patent Application Kokai Publication No. S63-142445 (June 14, 1988).*
11. Taguri, J.; "Memory Storage Device"; Japanese Patent Application Kokoku Publication No. B63-46864 (September 19, 1988).*
12. Horiguchi et al., "Semiconductor memory having error correcting means", United States Patent No. 4,726,021 (February 16, 1988).
13. Ohno, C.; "Self-Timed RAM: STRAM"; Fujitsu Sci. Tech J., 24, 4, pp.293-300 (Dec. 1988).
14. Fast Packet Bus for Microprocessor Systems with Caches, IBM Technical Disclosure Bulletin, pp. 279-282 (January 1989).
15. Kumagai, T.; "Storage System"; Japanese Patent Application Kokai Publication No. S64-29951 (January 31, 1989).*

16. Gustavson, D.; "Scalable Coherent Interface"; Invited Paper, COMPCON Spring '89, San Francisco, CA; IEEE, pp. 536-538 (Feb. 27-Mar. 3, 1989).
17. James, D.; "Scalable I/O Architecture for Buses"; IEEE, pp. 539-544 (April 1989).
18. Kimoto et al., "Micro-computer Capable of Accessing Internal Memory at a Desired Variable Access Time"; U.S. Patent No. 4,870,562 (September 26, 1989).
19. JEDEC SDRAM standards.

* Translation Included